CERTIFICATION/VERIFICTAION

I do hereby declare under the penalty of perjury under the laws of the United States of America that the translation attached herewith is, to the best of my knowledge and ability, a complete, true, correct, ENGLISH language translation providing all information contained in the original JAPANESE language document(s) also attached herewith.

I am fluent in the JAPANESE and the ENGLISH language.

So executed in

9-1-502, Kamiyugi 3-chome, Hachioji-shi, Tokyo, Japan, Date: September 11, 2007

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Specification: 1
Drawing: 1
Abstract: 1

[Document ID] SPECIFICATION

[Title of the Invention] MUSICAL PERFORMANCE SELF-TRAINING APPARATUS

[What is claimed is:]

1. A musical performance self-training apparatus for supporting a player by displaying a performance instruction information on a display means, comprising:

a lesson menu having the units which are provided to include wider range of musical tone information, as the skill level become higher, are displayed according to the skill level corresponding to the score, and

a unit designating means for designating a unit to be displayed next, which is included in the lesson menu.

2. The musical performance self-training apparatus according to claim 1, wherein

the unit designating means designates a unit to be played at the earliest timing, in which performance thereof has not reached a predetermined acceptable standard, of the units on the lesson menu, as a unit of which performance instruction is to be displayed next, and when performance of all units in the same skill level has reached the acceptable standard, the unit of which performance instruction is to be displayed next is selected from units in the upper ranking skill level than the current skill level and designated.

3. The musical performance self-training apparatus according to claim 1, wherein

the unit designating means designates a unit to be played at the earliest timing, in which performance thereof has not reached

a predetermined acceptable standard, of the units on the lesson menu, as a unit of which performance instruction is to be displayed next, and when performance of all units in the lower-ranking skill level included in a unit of the higher ranking skill level has reached the acceptable standard, the higher ranking unit is designated as the unit of which performance instruction is to be displayed next.

4. The musical performance self-training apparatus according to any one of claims 1-3, wherein, wherein the display means separately displays a trained unit and a unit whose note information is to be displayed next, at the time of displaying the lesson menu.

5. The musical performance self-training apparatus according to any one of claims 1-4, wherein the display means separately displays unit which come up to a evaluation standard and unit which does not come up to the evaluation standard, at the time of displaying the lesson menu.

6. The musical performance self-training apparatus according to claim 4, comprising result processing means which evaluates the performance result of the designated unit, and the display means displays the evaluation in the trained unit, at the time of displaying the lesson menu.

7. The musical performance self-training apparatus according to any one of claims 1-6, wherein units having the same content is managed collectively as the same unit.

8. The musical performance self-training apparatus according to any one of claims 1-7, comprising means for changing the size of

the unit displayed in the lesson menu by giving an instruction input through the lesson menu.

[Detailed Description of the Invention]

[0001]

[Field of the Invention]

The present invention relates to a musical performance self-training apparatus, and more specifically, relates to a musical performance self-training apparatus that can enable efficient lesson by designating a lesson part of music to be performed, corresponding to the skill level of a player in the musical performance for a given music.

[0002]

[Description of the Related Art]

There is known an apparatus which plays performance data stored in a recording medium by a personal computer, and displays an image representing sheet of music sequentially on a screen, to thereby give a performance instruction. For example, in Japanese Patent Application Laid-Open No. Hei 9-305171, there is disclosed an apparatus which gives a performance instruction in which keys are instructed sequentially by graphical bars. More specifically, in this apparatus, a figure of a keyboard is displayed on a screen, and a scroll bar having a length corresponding to the duration of key depression is also displayed corresponding to each key on the displayed keyboard, and this scroll bar is scrolled so that the scroll bar approaches the keyboard figure, as the auto-playing data is played.

[0003]

According to this conventional performance instruction apparatus, the player can recognize the duration of key depression intuitively, and a performance data to be performed subsequent to the performance data being currently performed can be known in advance. Therefore, a smooth performance or playing is expected.

[0004]

[Technical Problems to be solved by the Invention]

However, with the conventional performance instruction apparatus, since the performance data is only played sequentially from the beginning which is monotonous, efficient training cannot be conducted and the player become bored. For example, it is quite difficult for a player, who is training for given music for the first time, to play from the top of the music to the very end all the way through. Moreover, even if the player interrupts on the way to return to the beginning, or return to a desired training part, it is troublesome and time-consuming to search the part to be played.

[0005]

In a music the same phrase appears in a plurality of places, even when this phrase is mastered, when the player has the training all the way through, he/she has to play this phrase many times, and hence lesson may becomes boring. It is not efficient and not desirable to have repetitive training for the phrase mastered to a certain degree, from a viewpoint of mastering the entire music as soon as possible.

[0006]

Therefore, a system in which the skill level of the entire music can be efficiently enhanced is desired, by avoiding repetition of training for the mastered phrase.

[0007]

It is an object of the present invention to provide a musical performance self-training apparatus, which makes it possible to repetitively train for a part having not mastered yet, to thereby efficiently master the entire music.

[0008]

[Means to solve the technical Problems]

In order to accomplish the above objections, the present invention has features described bellow.

The first feature of a musical performance self-training apparatus according to the present invention is that comprising a lesson menu having units which are provided to include wider range of musical tone information, as the skill level become higher, are displayed according to the skill level corresponding to the score, and a unit designating means for designating a unit from the plural units.

[0009]

The second feature of a musical performance self-training apparatus according to the present invention is that the unit designating means designates a unit to be played at the earliest timing, in which performance thereof has not reached a predetermined acceptable standard, of the units on the lesson menu, as a unit of which performance instruction is to be displayed next, and when

performance of all units in the same skill level has reached the acceptable standard, the unit of which performance instruction is to be displayed next is selected from units in the upper ranking skill level than the current skill level and designated.

[0010]

The third feature of a musical performance self-training apparatus according to the present invention is that the unit designating means designates a unit to be played at the earliest timing, in which performance thereof has not reached a predetermined acceptable standard, of the units on the lesson menu, as a unit of which performance instruction is to be displayed next, and when performance of all lower level units included in the upper ranking level units has reached the acceptable standard, the unit in the upper ranking level units is selected and is designated

[0011]

According to the first through third feature, the player can confirm the music to be played by the lesson menu in which the musical score is included. And a unit of the displayed music in the lesson menu is designated in order from the earliest one timewise, and the performance instruction information included in the unit is displayed.

[0012]

Especially, according to the second feature, if the performance related to all units of the same skill level reach the acceptable standard, the player cannot advance to the upper level training, and hence the player can be reliably master the music.

According to the third feature, if the player cans performance related to the units of certain level collectively, the player can advance to the lesson of the units in the upper skill level including these units.

[0013]

The fourth feature of the present invention is to provide a display means for distinguishably displaying units which training has finished from units which training has not finished. The fifth feature of the present invention is to provide a display means for distinguishably displaying units which has reached the acceptable standard from units which training has not reached the acceptable standard. According to the fourth and fifth features, players can confirm advancing degree of their training by observing the lesson menu.

[0014]

The sixth feature of the present invention is to provide a result processing means for ranking a performance result of the designated unit, wherein when display the lesson menu, add the ranking of the result of the performance to the units which training has finished. A player can recognize the result for every unit.

[0015]

The seventh feature of the present invention is to commonly manage the unit that has same content as a same unit. If the unit having a same content repeatedly appeared, these units are managed totally so that the unit which performance has once passed or reached acceptable standard is not designated repeatedly.

[0016]

The eighth feature of the present invention is to Provide a means for varying unit size the unit is displayed in the lesson menu.

[0017]

According to the eighth feature, if the player determines that he or she can not training effectively with current unit dividing way, the player can move the boarder line of the unit to vary the size of the unit. The size of the unit become wider as the players skill level, however, when designate the unit, players can vary the size of the unit without varying the grade of the skilled level, thus the player can expand the area in order to determine the area that can be played at a time.

[0018]

[Preferred Embodiments]

The present invention will be described in detail, with reference to the drawings. Fig. 2 is a block diagram showing the constituent of the musical performance self-training apparatus according to one embodiment of the present invention. In the Fig. 2, a personal computer 1, that is, a PC comprises a PC body 11, a keyboard 12 and a mouse 13 as an input unit, and a display 14 as an output unit. For the PC body 11, one having a known constituent having a hard disk, ROM, RAM and the like can be used. It is desired that the PC body 11 comprise an interface that can input and output an MIDI (musical instrument digital interface) signal.

[0019]

A keyboard instrument 2 comprises a keyboard 21 and a sound system 22. The keyboard instrument 2 comprises a detection circuit

23 connected to the keyboard 21 to detect key depression and key release information on the keyboard 21, and a tone generator 24 for generating tone corresponding to the key-on or key-off information. When the detection circuit 23 detects key depression or key release on the keyboard 21, the tone generator 24 generates the tone, based on the depressed key number (key number), the key-on length, the key-on velocity and the like, and outputs (produces) musical sound through the sound system 22. It is desired that the keyboard instrument 2 also comprise an MIDI. The overall operation of the keyboard instrument 2 is controlled by a microcomputer (not shown).

[0020]

The PC body 11 and the keyboard instrument 2 are connected via an interface such as the MIDI (not shown), so that a signal can be transferred between these.

[0021]

In the musical performance self-training apparatus, music information for training can be externally supplied, or one which is stored in a known storage medium such as a hard disk beforehand may be used. The music for training is prepared as performance data such as musical tone data (note number), key press /key release data (key-on time, key-off time), velocity, and tempo data. The performance data may include data other than the above-described data, but it is not the main part of the present invention, and hence the description thereof is omitted.

[0022]

The selected music information can be played not only from the beginning, but may be played halfway of the music. The training part may be automatically designated, or may be designated manually by the player him/herself. The training part can be designated for each predetermined range (referred to as a unit). The unit comprises notes which are included in one or a plurality of bars, and as the degree of skill level, that is, the grade becomes higher, the number of bars constituting one unit increases.

[0023]

Here, explanation is given by assuming that the unit is composed of a plurality of bars, but the construction or the number of the bars which constitutes the unit is variable, and may be composed of not only the bars, but also optional part of the music. For example, musically natural training is possible, by constituting one unit by one or a plurality of motifs or phrases. In short, it is only necessary to constitute the unit so as to include wide range of note information, so that as the rank, that is, the skill level becomes higher, the player can have training for longer performance at a stretch.

[0024]

In the case of automatic mode in which the unit is automatically designated, the training unit is automatically designated according to the predetermined progress. For example, the skill level is automatically judged by the PC 1 based on the performance result, to designate the unit for next performance, taking into consideration that the player does not train repetitively for the unit in which the skill level has reached the acceptable standard. On the other

hand, in the case of manual mode in which the unit is manually designated, the player him/herself can selectively designate the unit which he/she wants to have training. The manual mode may be released to return to the automatic mode, or the lesson may be interrupted during the automatic mode to optionally designate a unit. A data for generating a mode selection display on a screen can be included in the performance data so as to be displayed on the display 14 at a predetermined timing.

[0025]

Fig. 3 is a diagram showing one example of the lesson menu, the diaphragm includes units for each rank corresponding to the score. In Fig. 3, one or plural unit U which has various size are set for each rank, with respect to the score for 12 bars displayed on the display 14. If the music is longer than the length of one screen, the displayed picture is can be scrolled to display the picture including the last part of the music score. Alternatively, instead of scrolling on the screen, the part of the music or the whole part may be displayed, by enlarging or reducing the display size. For example, displayed buttons "+" and "-" on the left bottom corner on the screen can be operated to scale the screen.

[0026]

The skill level in the performance is designated as rank R1, R2, R3, R4 and R5 in order of from the higher rank, and the unit in which the size, that is, the number of bars included therein, is changed is set corresponding to each rank. In the lowest rank R5, two bars constitute one unit, and in the next higher rank R4,

four bars constitute one unit. In this manner, as the rank becomes higher, the number of bars constituting one unit increases.

[0027]

The lesson menu is a list, in which the result based on the performance result can be seen at a glance, and is also a display of the next training unit. When the music performance of the designated unit has finished, the performance result is compared with the prepared model performance data, to judge the result. The result is displayed in the lesson menu with a character representing the grade, and the unit which has not reached the acceptable standard is designated again.

[0028]

In the example shown in Fig. 3, it is displayed that the training of unit U1 consisting of the first bar and the second bar in rank R5 has finished, and unit U2 consisting of the third bar and the fourth bar is displayed as the next training unit. The result is displayed in the unit already played. The result is displayed with characters of S, A, B, C and D in order of higher grade. In the units U1 and U3 having reached the acceptable standard, the character of grade "S" and a band indicating acceptance are displayed. However, this classification of result is an example only, and the number of grades can be optionally set, and the acceptable standard can be elevated, as the rank becomes higher. When the acceptable standard has not been reached, the designation of the unit is not updated, and the same unit is designated again.

[0029]

In the mode of automatically designating the unit, a unit to be played at the earliest timing in the same rank, of the units which has not reached the acceptance mark, is designated.

[0030]

Since the result of the unit having the same musical tone information is managed collectively, as shown in the Fig. 3, when the unit U1 has reached the acceptance mark, the unit U3 consisting of the ninth and the tenth bars having the same music tone information or note data array as that of the unit U1 is regarded as having trained already, and the display is changed to the result displaying. Therefore, it is avoided to have repetitive training of the mastered unit.

[0031]

When a unit is designated and the performance data of the designated unit is played, the key depression instruction described later is displayed on the display 14. The player can repetitively train according to the display of the key depression instruction, until the skill level of performance is enhanced for each unit, that is, a predetermined acceptance judgment is obtained.

[0032]

When all units are judged as being acceptable with respect to the current training rank, the player can proceed to the next higher rank, where a unit having a larger size, that is, a unit having a large number of bars is designated, and the performance data for this unit is played. For example, when the player has come up to the standard in rank R5, the player proceeds to rank R4, where

unit U4 is designated, and the performance data is played. In rank R4, the player has training for the number of bars twice the number in rank R5 at a stretch or without interruption. As the rank becomes higher, the degree of difficulty, that is, the tempo and the acceptable standard is increased, thereby training of higher degree corresponding to the skill level becomes possible.

[0033]

On the other hand, in the case of training in the manual mode, the unit is designated selectively, by the player's own will, to play the performance data. Therefore, training can be performed repetitively until the trainee is satisfied. However, if the player can totally optionally designate the unit in the manual mode, the training may not be resultful, and hence it is desired that the rank cannot be elevated until the performance result reaches the allowable level. In other words, until all units in the current rank reach the acceptance mark, only the unit in the current rank can be designated, and the unit in the higher rank cannot be designated.

[0034]

Each unit can have the data structure described below. That is, unit result information, link information and result information can be included as the data of each unit.

[0035]

The unit result information shows training result for each unit, and can include high score, average score, registered date of result, and the like. The unit having the same musical tone

information is managed with the common unit result information, with a unique ID enabling identification of the unit.

[0036]

The link information is registered for each unit, and having the lead position and the tail end position (both are set as time information) of the unit based on the beginning of the music, and a link ID which links a plurality of units having the same musical tone information. The result information has array information of the link information for each rank and each unit in the entire music.

[0037]

The processing by the musical performance self-training apparatus will be described, with reference to the flowchart. Fig. 4 is a main flowchart. In step S1, initialization of the PC 1 including clear of a VRAM, which stores image data for displaying an image on the display 14, and clear of timer counter is conducted. In step S2, a music is selected. For example, a list of music is displayed on the display 14, and the player selects one from the list, by operating the keyboard 12 and the mouse 13. After selection of the music, process proceeds to step S3, where a unit is designated. Designation of unit is for designating which part of the performance data of the selected music is a training object, and a lesson menu based on the performance data is displayed on the display 14, and the training unit is specified thereon. An example of the lesson menu in which a unit is set is shown in Fig. 3. Designation of the unit will be described later with reference to Fig. 5.

[0038]

In step S4, the lesson is started. The lesson may be started automatically, or start instruction may be given by using the keyboard 12 and the mouse 13. In step S5, the key depression instruction is displayed on the display 14 according to the performance data. The display example of the key depression instruction will be described later with reference to Fig. 6.

[0039]

In step S6, musical tones included in the performance data, that is, accompaniment and metronome sound are played. The played sound can be produced using the tone generator 24 and the sound system 22 in the keyboard instrument 2. In step S7, the performance results of the player, that is, the key depression time, the key release time, the velocity and the like are read in the PC 1, for evaluation of the performance. It is desired to perform the process of steps S5 to S7 by interrupting handling. When the pitch (represented by a note number) designated by the played performance data and the pitch (represented by a depressed key) in the performance result do not coincide with each other, reproduction of the performance data is not advanced to the next stage.

[0040]

In step S8, it is judged whether the lesson is finished. When performance for all of the performance data of the designated unit has finished, the judgment in step S8 becomes affirmative, and process proceeds to step S9. When the lesson is not finished, process proceeds to step S5.

[0041]

In step S9, result processing or evaluation is performed. In the result processing, the performance result read in step S7, that is, the depressed key data is compared with the prepared performance data, and the result is judged according to the degree of coincident. The comparative contents include the length of the note (duration of key-on), the velocity, the key depression timing and the like, and the number of miss-touch, that is, the number of key depression in which different key from the designated key by key depression instruction is depressed may be compared with the number of the acceptable standard. In the result processing, the grade is determined based on the comparison results.

[0042]

In step S10, as a result of the result processing, it is judged whether the performance of the designated unit by the player reaches the acceptable standard. If the unit has reached the acceptable standard, process proceeds to step S3, to provide a unit to be played next. In the case of nonacceptance, process proceeds to step S11, to judge whether the training is to be continued. This judgment can be made based on the existence of instruction by the player, using the keyboard 12. If the training is to be continued, process proceeds to step S4.

[0043]

Fig. 5 is a flowchart for designating a unit (step S3). In step S31, it is judged whether designation process is executed by automatic mode or manual mode. An instruction information that instructs automatic designation or manual designation may be

included in the performance data. In the case of automatic mode designation, process proceeds to step S32, and in the case of manual mode designation, process proceeds to step S33, to display a lesson menu. In step S33, it is desired to display a message to call a player's attention for giving instruction, such as "Please designate a unit", on the lower part of the screen, together with the display of the lesson menu shown in Fig. 3. As indicating the unit by using the mouse 13, in step S5, the performance data is read according to the link information of the unit, and the key depression instruction is displayed corresponding to the performance data.

[0044]

In the case of automatic designation, process proceeds from step S31 to step S32, to judge whether the performance for all units in the highest rank has come up to the passing mark. If the player has not passed the highest rank, process proceeds to step S34, to judge whether the performance of all units in the current rank is acceptable based on the unit result information. If this judgment is negative, process proceeds to step S36, to designate the training unit to be played next. For example, as shown in Fig. 3, the display is changed such that unit U2 is enclosed by a frame, and then process proceeds to step S4 (Fig. 4). If the judgment in step S34 is affirmative, process proceeds to step S35, to elevate the rank by one stage, and process proceeds to step S36. For example, when the rank is elevated by one stage from rank R5 to rank R4, in step S36 immediately thereafter, a unit consisting of the first four bars in rank R4 is designated. In this manner, when the player is passed

the highest rank R1, the judgment in step S32 becomes affirmative, to finish the processing.

[0045]

Fig. 6 is a diagram showing one example of the key depression instruction displayed on the display 14 in step S5 shown in Fig. 4. In the Fig. 6, the keyboard figure is displayed on the upper part and the lower part of the screen. In order to make it easy to see to which key on the keyboard the key depression instruction corresponds, the keyboard figure K is displayed on upper and lower area of the screen, but this figure (Fig. 6) may be displayed only on the lower area of the screen. A plurality of substantially rectangular marks having a length corresponding to a length or a vertical size of the note, and a width of the white key in the keyboard figure K, and displayed between the keyboard figures K and K, is the key depression instruction. One mark corresponds to one note. On the display, the vertical direction indicates a time axis, and as the key depression instruction mark becomes closer to the lower keyboard figure K, it shows a note to be played at the earlier timing. The key depression instruction mark M moves downward at a predetermined tempo, and it is the timing to play the key when the lower end of each key depression instruction mark reaches the upper edge of the lower keyboard figure K. On the other hand, it is the key release timing of the key when a key depression instruction mark corresponding to the key now being depressed is scrolled downward and disappears from the screen. The movement, that is, scrolling of the key depression instruction mark is executed when the player

plays the key as instructed. The scroll may start at the time of key release, instead of key depression.

[0046]

As the display method of the key depression instruction, for example, one described in Japanese Patent Application No. 2001-352206 according to the application by the present applicant may be applied. Display of the key depression instruction is not limited to the scroll type in which musical parts are sequentially scrolled, and the entire music may be instructed at the same time, or scrolling or switching of the screen may be carried out to proceed the display forward. Moreover, when the key depression instruction is scrolled, the velocity thereof is optional, and may be according to the tempo of the music.

[0047]

Fig. 1 is a block diagram showing the main function of the PC 1 for designating the unit. In this figure, the result information for a performance of the music related to each unit is stored in a result storage 3, every time the performance of each unit finishes. A unit acceptance judge 4 judges whether the performance of all units in the current rank reach the acceptable standard by comparing the information stored in the result storage 3 with the prepared standard performance data. When all the units which is performed are accepted, the judgment result is inputted to a rank-up instruction section 5. The rank-up instruction section 5 responds to the input judgment result, and outputs a rank-up instruction to a lesson menu generator 6. By this rank-up instruction, the lesson menu generator

6 generates data for displaying menu including designation of the first unit in the rank upper than the current rank by one stage as a unit to be played next, and the display 14 displays a lesson menu responding to the data provided by the lesson menu generator 6. For example, a unit to be played next is enclosed by a thick frame, as the unit U2 shown in Fig. 3.

[0048]

The unit is designated on the lesson menu, and the performance data representing the score in the designated unit is read out from performance data storage 7 to a key depression instruction generator 8. The key depression instruction generator 8 generates key depression instruction information based on the performance data and outputs the information to the display 14, to display an image shown in Fig. 6.

[0049]

When the unit acceptance judge 4 judges that only performance of a part of the units in the current rank is acceptable, the judgment result is input to a unit update section 9. The unit update section 9 responds to the input judgment result, and outputs a unit update instruction to the lesson menu display section 6. The lesson menu generator 6 outputs data having a designation where the unit subsequent to the currently designated unit is the unit to be played next, according to the unit update instruction. Since the unit having the same content is controlled collectively, at the time of updating the unit, the unit having the same musical tone information as that of the unit that has been accepted is not designated, and a unit

to be played next is designated.

[0050]

The display format of the lesson menu is not limited to the image corresponding to the score, as shown in Fig. 3. Fig. 7 is a diagram showing an example of the lesson menu in which the score is represented by a keyboard figure and a mark corresponding to the keyboard figure. The keyboard figure K is arranged in the lower part of the screen, and above this keyboard figure K, a time axis is elongated vertically, and a mark having a length corresponding to the length of the note is displayed. On the right side of this mark, a unit for each rank is displayed.

[0051]

In Fig. 7, there is shown an example in which the unit including the first to the fourth bars in rank R5 is performed acceptably, and the unit including the fifth to the eighth bars is performed unacceptably (grade D), and hence the unit consisting of the fifth and sixth bars is designated again.

[0052]

In the above-described embodiment, the unit is designated such that when the performance of one unit is executed acceptably, the next bar is selected in the same rank to be played. However, the designating method is not limited to this, and the unit may be set so that the player can have continuous training for many bars at a stage as early as possible.

[0053]

For example, in Fig. 3, when unit U1 and the unit adjacent to unit U1 are accepted, the next unit in the same rank is not designated

next, but the rank is elevated by one and the first unit in the upper rank R4 may be designated. Since the first unit in rank R4 consists of the first two units in rank R5, relatively long performance can be experienced in rank R4 where training for these two units is performed in succession.

[0054]

When the performance of the first unit in rank R4 is accepted, returning to rank R5 again, the third unit is selected. When the performance of this unit is accepted, the fourth unit in rank R5 is selected. When the performance of the fourth unit in rank R5 is accepted, the second unit in rank R4 is selected. When the performance of the second unit is accepted, the first unit in rank R3 is selected. In this manner, when the performance of the unit in the lower rank included in one unit of the upper rank is accepted, training can be performed by proceeding to the upper rank in order to play longer bars of music.

[0055]

The key depression instruction is set such that unless the key as instructed is not played, scroll is not carried out, in order to improve the skill level. However, in the highest rank R1, the skill level of the player should be improved. Therefore, even if the key is not played as the key depression instruction indicates, the key depression instruction information, that is, the mark may be scrolled. It is for enabling through training of the entire music.

[0056]

The unit may not be fixed. The borderline between units set

in the performance data is set to a size, which is considered to be desirable for many users. However, this setting may be difficult to play for some users. For example, when a player wants to practice for a long part at a stretch, if the unit is fixed, the player must have playing of a higher rank having a larger unit size. In such a case, if the player can change the borderline to change the size of the unit, only the length to be played at a stretch can be changed without changing the rank, which is preferable.

[0057]

Moreover, when a unit is set in advance in the performance data, for example, it is easier to divide the unit by two bars mechanically. However, for example, in the case of a music starting with up beat (Auftakt), in which a break in performance does not exist in the bar line, a unit divided by the bar is inconvenient. In such a case, it is quite convenient if the borderline between units can be shifted.

[0058]

Fig. 8 is a diagram showing a setting example of units, which is not appropriate. This figure shows a music starting with an Auftakt or up beat (name of the song: Hotaru no Hikari in Japanese), and the units are set such that two bars simply constitute one minimum unit. This song is well known, and it can be considered that a beginner may practice while humming the lyrics. With the division of units shown in this figure, however, it does not correspond to the syllabic for Japanese pronunciation, such as "ho-ta-runo-" and "hi-kaa-ri-", and hence it is difficult to play.

[0059]

Therefore, the borderline between units is reset, so that practice can be done by a unit division corresponding to the syllabic for Japanese pronunciation. In this manner, since the range to be played at a stretch corresponds to a unit, it becomes easy to practice especially for a beginner.

[0060]

Fig. 9 is a diagram showing an example in which the borderline between units is reset. As described above, the division of units is changed, and the lesson menu is created so that playing according to the lyrics of "Hotaru no Hikari" is possible.

[0061]

This example shows a simple up beat music, for easy understanding. Actually, however, there is various complicated music, and it is difficult to set the units fully appropriately automatically by a computer. Therefore, it is meaningful to have a function of resetting the division of units.

[0062]

Fig. 10 is a diagram showing a lesson menu of another music, in which it is desired to reset the units. In this music, a player must proceed to rank R1, in order to have continuous practice for the eighth and the ninth bars. Therefore, for example, in rank R4, a unit including the eighth and the ninth bars is set, so that the player can have practice for the eighth and the ninth bars continuously. In this manner, one playing range can be reset in the lower rank according to preference, thereby enabling effective practice.

[0063]

In order to change the size of the unit, for example, a player specifies a borderline (vertical line for providing unit) between units which the player wants to shift by the mouse 13, and draws the borderline to an optional position. Other than this method, a borderline between units may be added newly, or an existing borderline may be deleted. In this case, the borderline is rounded off to a vertical line (a line roughly dividing for each one note) shown on the score. As the method for editing the line in the figure, a known drawing method with a computer can be employed.

[0064]

When the unit is reset, the area for managing the result is also changed. For example, in an example shown in Fig. 10, when the eighth and ninth bars are designated as one unit, result management is performed for this unit.

[0065]

In the above embodiment, an example in which the key depression instruction and lesson menu are displayed according to the performance data is shown. However, the performance data may be used as data for auto-playing. In this case, a switch for starting model reproduction is included in the lesson menu, and by instructing this switch by the mouse 13, model performance is performed according to the performance data included in the training part, that is, the designated unit. The model performance may automatically finish when the reproduction, that is, performance of the performance data in the unit has finished, or a switch for stopping the model reproduction may be provided in the lesson menu.

[0066]

Moreover, the performance result can be listened and confirmed. In this case, a recording/reproduction switch is provided in the lesson menu, and the performance result is recorded in a memory in the PC body 11, and the recording result can be played. Model reproduction and reproduction of the performance result are performed, by using a sound unit connected to the keyboard instrument 21.

[0067]

[Advantages of the Invention]

As is obvious from the above explanation, according to the inventions claimed in claim 1-7, the training part can be designated with units having different sizes for each skill level, and when a predetermined unit in each skill level reaches the acceptable standard, training for the upper skill level is performed. Therefore, the skill level can be gradually elevated, while gradually extending the training range.

[0068]

Especially, according to the inventions claimed in claim 4,5 and 6 the player can have a look at the progressing degree of training in the lesson menu.

According to the invention claimed in claim 7, since the player does not train for the units having the same content repetitively, the training efficiency is increased, and the player is not bored due to monotonous training.

[0069]

According to the invention claimed in claim 8, since the unit

can be reset according to the preference, so as to enable easy training of the player, the training efficiency can be increased.

[Brief Description of the Drawings]

Fig. 1 is a block diagram showing the main function of a musical performance self-training apparatus according to the first embodiment of the present invention;

Fig. 2 is a system block diagram of the musical performance self-training apparatus according to the present invention;

Fig. 3 is a diagram showing a display example of a lesson menu;

Fig. 4 is a flowchart showing unit designation processing;

Fig. 5 is a flowchart showing unit designation processing;

Fig. 6 is a diagram showing a display example of a key depression instruction;

Fig. 7 is a diagram showing another display example of a lesson menu;

Fig. 8 is a diagram showing example of a lesson menu in which unit is inappropriate;

Fig. 9 is a diagram showing an example of a lesson menu in which unit setting is reset appropriately;

Fig.10 is a diagram showing an example of music in which The unit setting is to be changed.

[Description of Reference Numbers]

1: personal computer, 2: keyboard musical instrument, 3: memory of evaluated performance result, 4: unit acceptance judgment section, 5: rank up instruction section, 6: lesson menu generator, 8: key depression instruction generator, 9: unit update section, 12:

keyboard, 14: display

[Document ID] ABSTRACT

[Abstract]

[Object]

The apparatus of the present invention improves training efficiency, and monotonous repetition of training is avoided.

[Solution means]

A unit acceptance judgment section (4) judges whether all performance of the units in the current rank have reached an acceptable standard or not. When all performance is accepted, a unit in an upper rank is designated. The performance data in the designated unit is read out from a performance data storage (7) to a key depression instruction generator (8), and a key depression instruction is displayed based on the performance data. When only a part of the unit in the current rank is acceptable, a unit updating instruction is output to a lesson menu generator (6), to thereby display that the unit subsequent to the currently designated is the unit to be played next. When the unit is updated, the unit having the same note information as that already accepted is not designated.

[Representative Drawings] Fig.1

Fig. 1

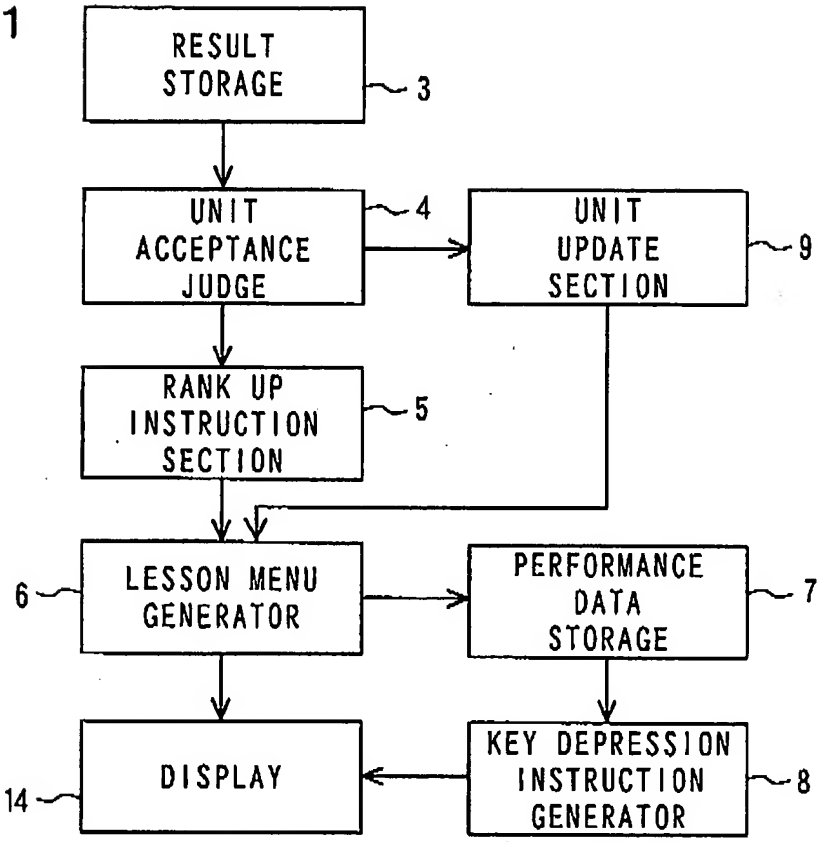
RESULT STORAGE
3
UNIT ACCEPTANCE JUDGE
4
UNIT UPDATE SECTION
9
RANK UP INSTRUCTION SECTION
5
6
LESSON MENU GENERATOR
PERFORMANCE DATA STORAGE
7
14
DISPLAY
KEY DEPRESSION INSTRUCTION GENERATOR
8

Fig. 2

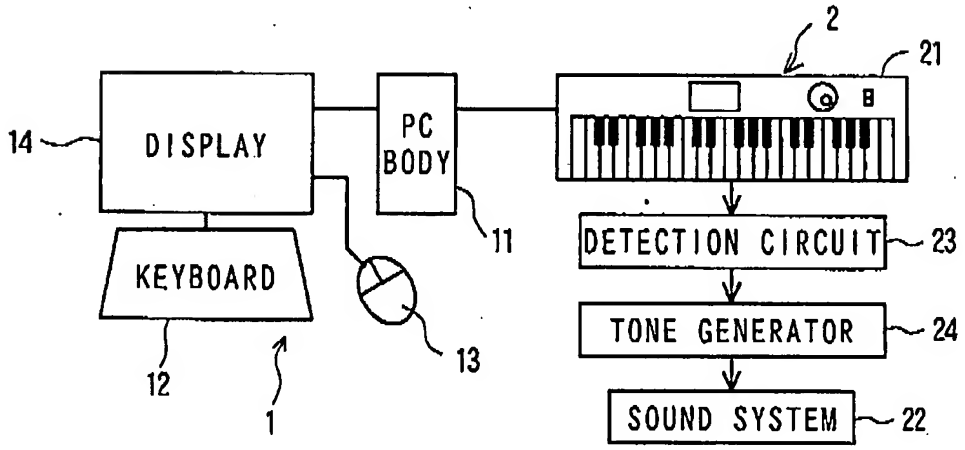
2
21
14
DISPLAY
PC BODY
11
DETECTION CIRCUIT
23
KEYBOARD
TONE GENERATOR
24
13
12
1
SOUND SYSTEM
22

Fig. 3

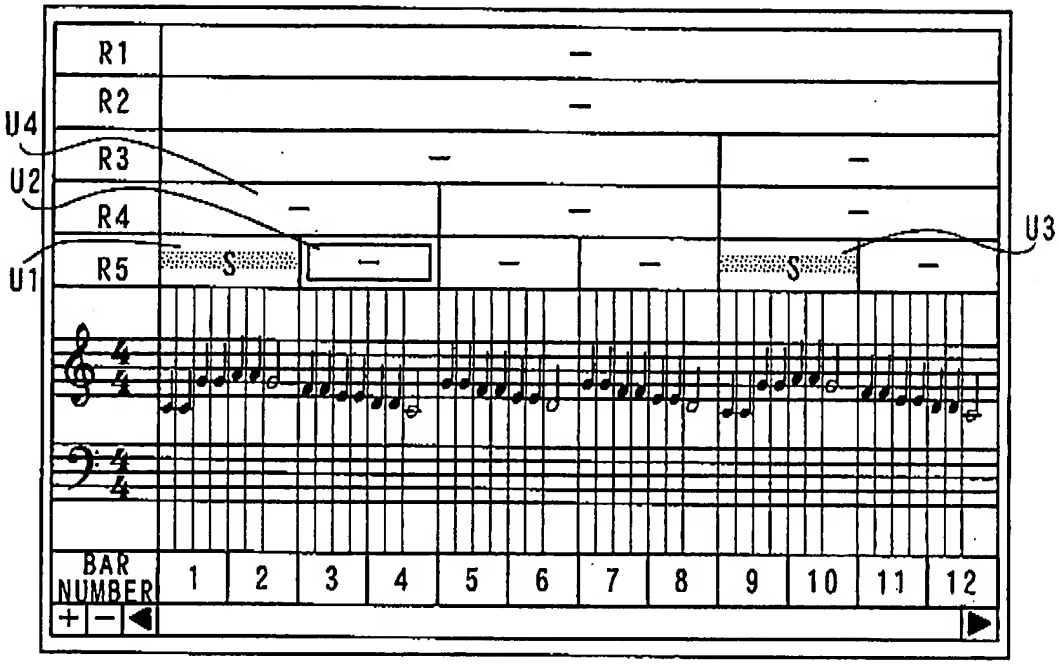

Fig. 4

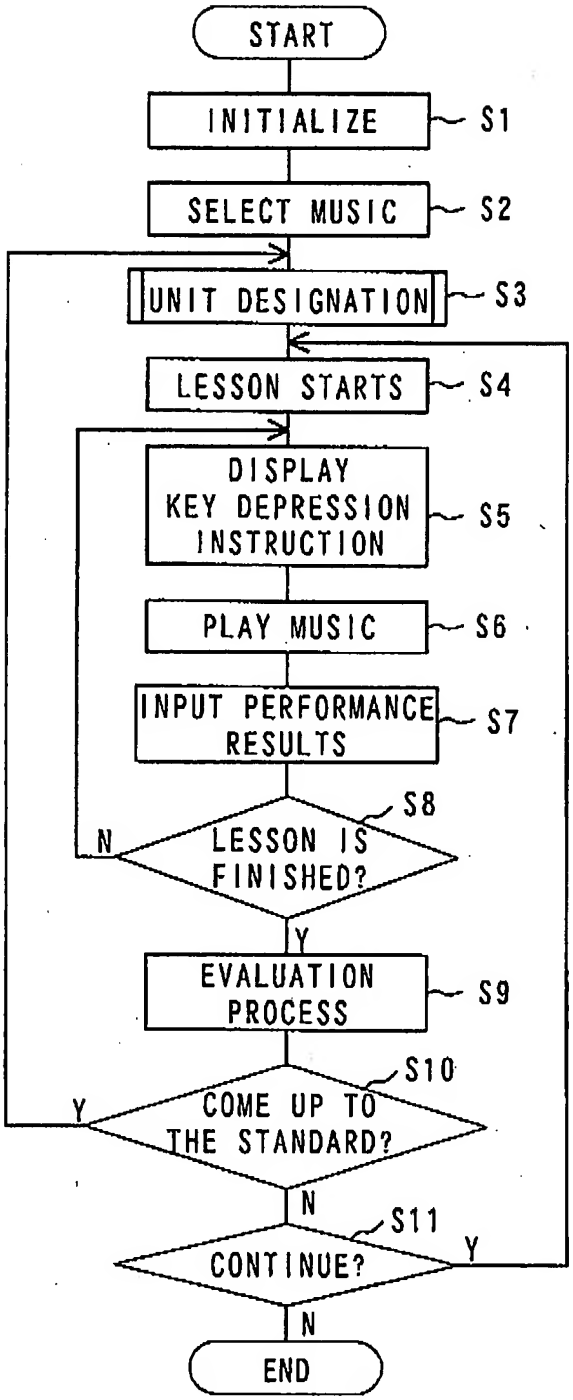
START
INITIALIZE
S1
SELECT MUSIC
S2
UNIT DESIGNATION
S3
LESSON STARTS
S4
DISPLAY KEY DEPRESSION INSTRUCTION
S5
PLAY MUSIC
S6
INPUT PERFORMANCE RESULTS
S7
S8
LESSON IS FINISHED?
N
Y
EVALUATION PROCESS
S9
S10
COME UP TO THE STANDARD?
Y
N
S11
CONTINUE?
Y
N
END

Fig. 5

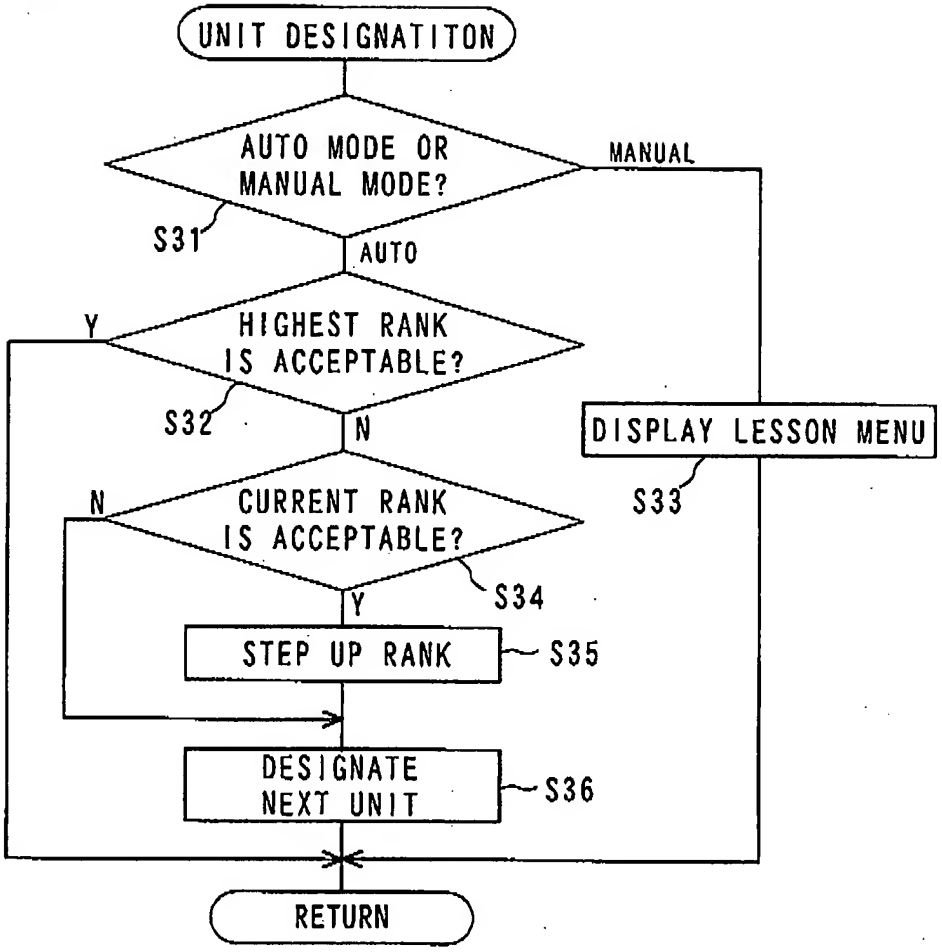
UNIT DESIGNATITON
AUTO MODE OR MANUAL MODE?
MANUAL
S31
AUTO
Y
HIGHEST RANK IS ACCEPTABLE?
S32
N
DISPLAY LESSON MENU
S33
N
CURRENT RANK IS ACCEPTABLE?
S34
Y
STEP UP RANK
S35
DESIGNATE NEXT UNIT
S36
RETURN

Fig. 6

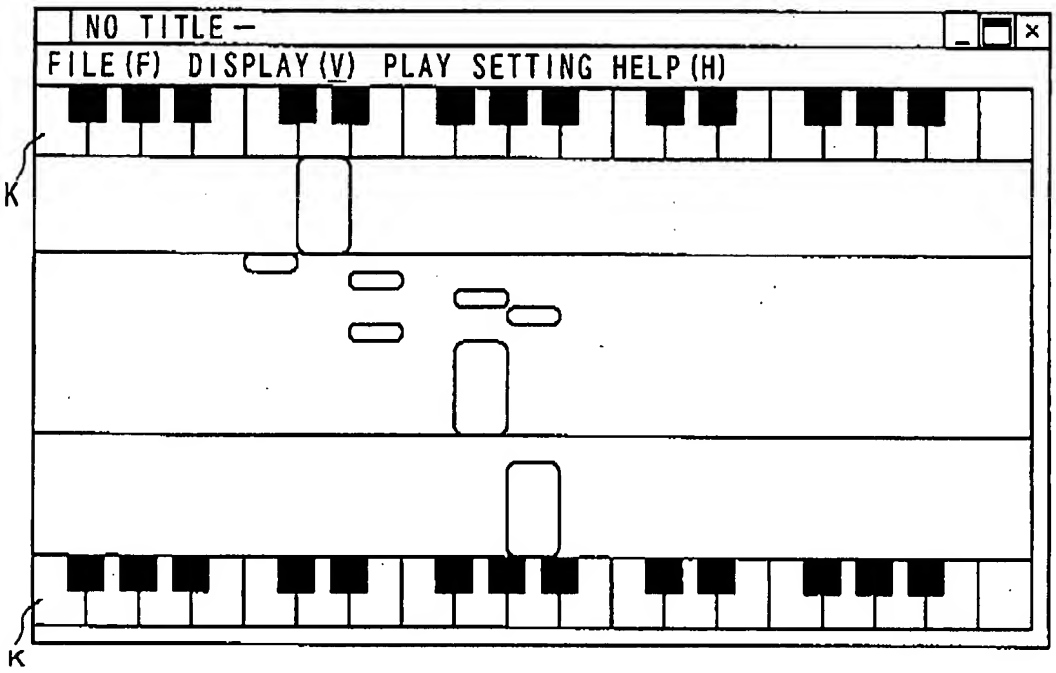
NO TITLE－
FILE(F) DISPLAY(V) PLAY SETTING HELP(H)
K
K

Fig. 7

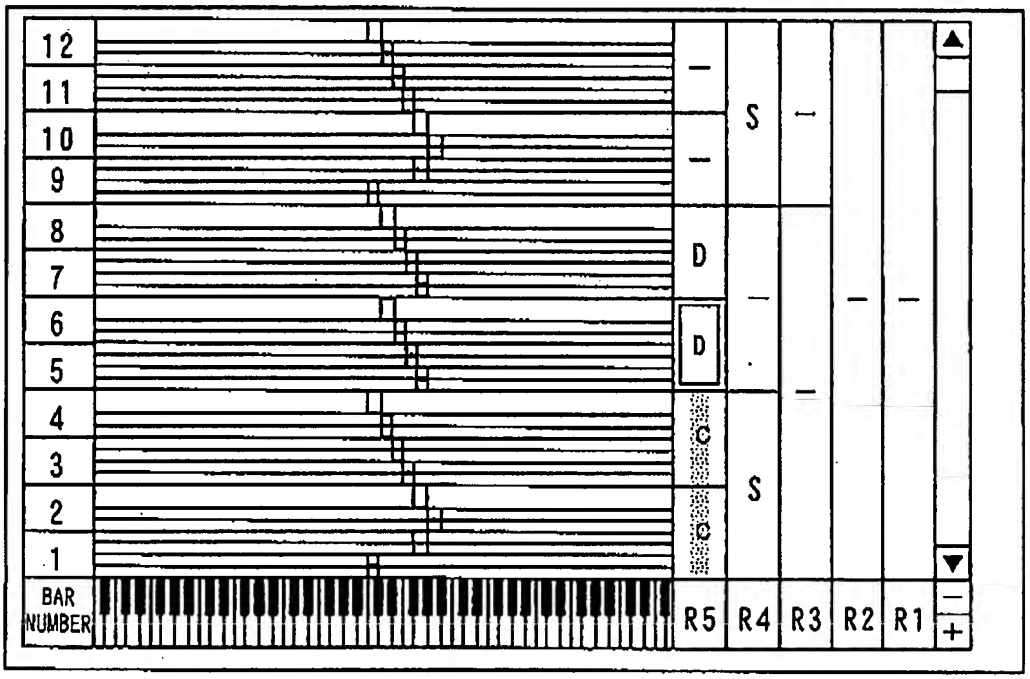
12
11
10
9
8
7
6
5
4
3
2
1
BAR NUMBER
D
D
C
C
S
S
R5
R4
R3
R2
R1

Fig. 8

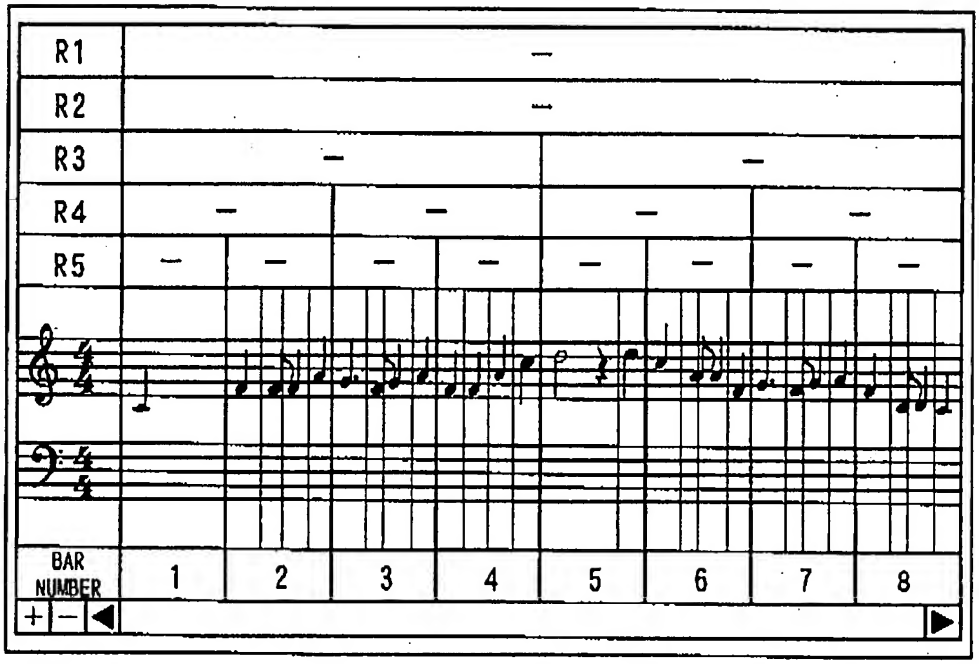
R1
R2
R3
R4
R5
BAR NUMBER
1
2
3
4
5
6
7
8
+
−

Fig. 9

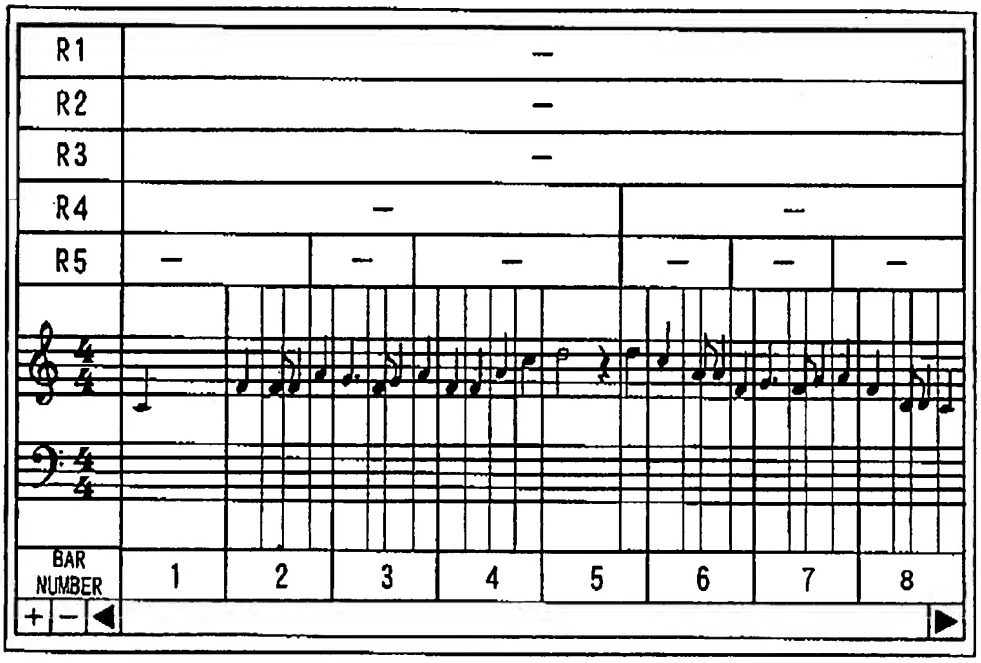
R1
R2
R3
R4
R5
BAR NUMBER
1
2
3
4
5
6
7
8
+
−

Fig. 10